

SIMPLIFIED LESSONS IN CARE OF AUTOMOBILE

Bolts and Nuts to Number of Thousand Enter Into Make-Up of Machine.

PARTS MUST BE KEPT TIGHT
Expert Guerlich Declares No Nut Should Be Put on Without the Thought of Fact That Some Day It Will Work Loose.

There are probably 1,000 or more bolts and nuts on the automobile. If these bolts or these nuts become loose they will not do that for which they have been furnished. For this reason a nut or bolt must never be put in without some thought being given to prevent its becoming loose. It must be locked in some way.

Each week, for the last thirty or forty years, many patents have been issued on nut locking devices, showing that this is one problem which has not yet been solved to the satisfaction of all. But of these devices explained here-with are, with a few exceptions, the only ones which are used. Each of these is used in special cases, and some of them must not be used under certain conditions.

The most commonly used locking device (popular because it is simple and cheap) is the spring lock-washer shown in Fig. 1. It is also called a "Split-Washer." This, as can be seen, is a split washer made of tempered steel, the split ends of which have been bent so that they point in opposite directions.

The washer, lettered A, is simply slipped over the bolt and the nut then screwed tight. The illustration shows the position of the washer when the nut is still a little loose. Note how the split ends of the washer are against the nut and the other against the metal of the part being held. When the nut is screwed tight, these ends will dig in, so that to unscrew the nut, some of the metal will have to be torn away before the nut will turn.

These lock-washers are very successful in the whole but are not absolutely reliable. If the bolt is long and subjected to much vibration, or if the load on it is intermittent, as a blow, the nut may stretch, and so the pressure on the washer will be decreased and the nut may turn. It is necessary, therefore, to periodically test the nuts. This type of washer should not be used in places where it cannot be got at and tested.

Hardened steel is liable to be brittle, and as the lock-washers have been hardened, they are very liable to break subjected to a shock. For this reason, they must not be used on the connecting rods, main bearings or like important moving parts. When used on a through bolt, one should also be put under the bolt head. Where possible the castle nut should be used, and this should be used with the through bolt.

GOOD PRACTICE TO CARRY

BOX ALONG WITH YOU
It is a good practice to carry a box of assorted lock-washers in the tool kit, and when, on taking off a nut, the old washer is found to be flat, to substitute a new washer.

Next, after the lock-washer, the nut is locked by being drilled through the end of the bolt and sticking a cotter pin through one of the slots and the hole in the bolt. This is shown in Fig. 2. A nut of this type is called a "cotter nut" and is generally used on important bolts and ones which cannot be looked after without removing other parts.

The greatest fault with the cast-iron nut, outside of its high cost, is that it is hard often to get the hole in the bolt and the slots in the nut, in line without loosening the latter. Changing the nuts about will often overcome this trouble. Here is a reason why it pays, when taking off a part, to screw the nuts back on their bolts. A good mechanic always does this, not only because they will go on easier, but the danger of their becoming lost is eliminated thereby.

Where a number of cap-screws (bolt-threaded screws with hexagon heads) are used, especially when placed in a circle, as on the universal flanges, differential and clutch springs, they are held fast by drilling small holes through the heads of the screws, and then running a wire through the hole of one screw after the other, as shown in Fig. 3. Leaving this wire off is a mistake which many often make.

When inserting the wire the position of the slots should be studied, and the wire inserted through a slot so that it will tend to tighten the screw, and not loosen it.

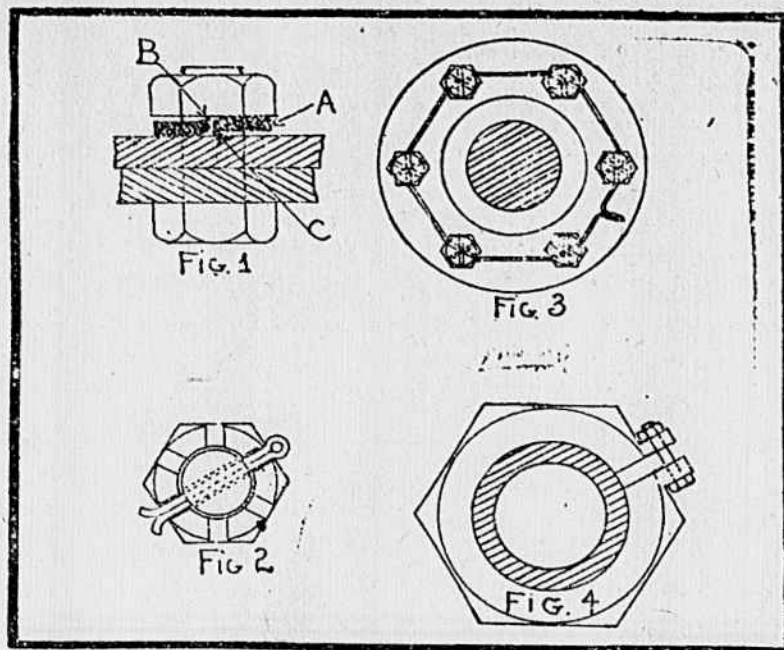
When the nut is of larger diameter, as the shifter tightening nut of the universal, or adjusting nut of the steering mechanism, it is customary to split the nut and to furnish it with a slot bolt so that it can be clamped tight on to the threads, after being turned on to the proper amount. This is shown in Fig. 4.

While the above are the most-used locking devices, a few specially designed ones will generally also be found. One who understands the above, will quickly see the action of these special devices.

QUESTIONS AND ANSWERS

(Copyright, 1918, by Fred. C. Guerlich.)
Q. I have had my car in use for about twenty months between now and then. I have now the time to go to it once over and clean all parts. If there is a

Bolts and Nuts Demonstrated



certain "first and last" in taking the engine apart and clean it, please give me the order. I have a good mechanical training, but am somewhat in doubt about the auto engine and its appliances.

A. There is no first or last in taking an engine apart outside of taking these parts in the way of others off first. When taking a part off study it, so that you will understand how it must be taken off.

Unless you find it absolutely necessary, do not remove gears or other parts which must be timed, but if you must, mark them with parts of which there are a number of removed. As the valves are numbered, they are numbered. When unbolting pistons, back, have the slots of the rings equal distances apart, so that there is not a straight passage for the gases to escape. To keep oil from escaping through nonmoving joints make a gasket of rubber (blotting paper is excellent), and coat it with shellac. At revolving parts, as the crank shaft, use felt washers. The former case, and under and lower crank case, etc.

A. I have a Ford car and would like to ask if there is any way to stop the noise in the vibrator box made by the breaker points. It sounds exactly like tapping on a tin can with the point of a nail. I have adjusted the points close, medium and far apart to no avail and the noise is all good, and test well under battery current. Two 1918, changing the units and the other two are of 1916. This metallic tapping sound has only developed since last March and is growing worse. It is loudest when spark is pretty well retarded or when car is going under a heavy load, and less when spark is advanced and car is running light. N. C. L.

A. If the noise is a metallic buzz and you know that it comes from the vibrators, believe that the best advice I can give is to let it alone. It is not a healthy noise. However, it is possible that some of the vibrator parts have become loose. The fact that the load and the position of the

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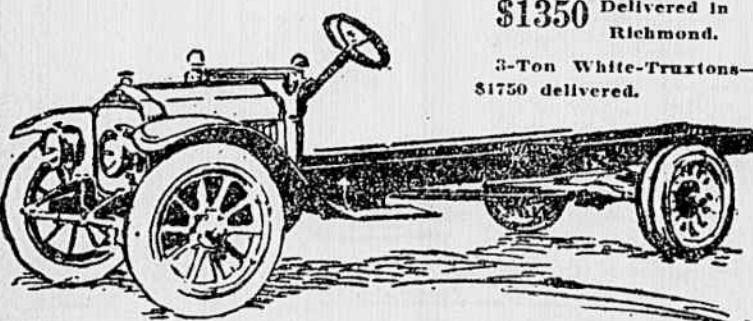
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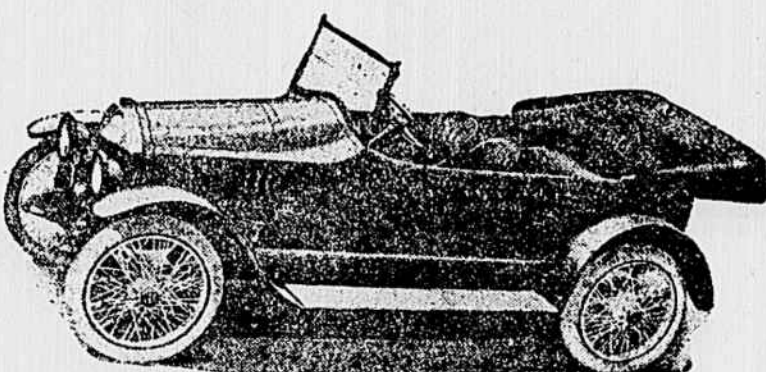
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see how it can get in. The pump leaks a little at the shaft, but I don't see how any of this water could get into the crank case.

A. It is quite possible that the water ran along the shaft and then in through the driving rear. Again, the products of combustion are water and carbon dioxide. It is possible that some of this water has got so into the crank case. The piston rings and so into the crank case.

Q. I have a 1916 (—) car, the clutch of which has been bothering me of late. I have had it at a garage and the mechanic said the clutch was all right, but he did not cure the trouble. He has had it three times, but has not helped back, but he did not cure the trouble. What would you advise?

A. You give me no information as to the symptoms of your trouble. So I cannot tell you the cause. Sometimes mechanics get a notion that a certain thing is the matter with a car, and will always diagnose the trouble with the preconceived idea that this certain thing is at fault. Another mechanic might attack your problem from a different point of view.

Q. Now that winter is coming please tell me what is the best thing to use in the radiator against freezing. A friend of mine says kerosene is better than alcohol because it does not evaporate so fast.

A. A. Kerosene will not stay mixed with water, but will separate from it, using in the radiator with water will mean that you will have a layer of water, and then a layer of kerosene. Of course the water can freeze. I believe alcohol to be the best antifreezing solution.

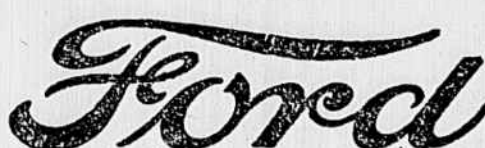
Q. I have been bothered with water getting in the oil in the crank case. I cannot

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